



Our ref: KON-1836

Client's ref: P6263-001-0000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of: N. SASA	: Art Unit: 1714
Serial No. : 10/718,408	:
Filed : July 13, 2001	: Examiner: C. E. Shosho
Title : ACTINIC RAY CURABLE INK	:
AND PRINTED MATTER	:
UTILIZING THE SAME	:

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DECLARATION

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

S i r:

I, Nobumasa Sasa, hereby declare and say as follows:

1. I am the inventor of the present invention.
2. I majored in chemistry and received a Master's degree in Technology from Chiba University in March 1976. During my

employment at Konica Corporation (now Konica Minolta Medical & Graphic, Inc.), the Assignee of this application, I have engaged in the research and study of photosensitive materials.

3. I am aware that the Examiner has rejected this application based on Roth (US 5,889,084) and Watanabe (US 6,783,840). Tests have been performed and are reported herein to demonstrate that the ink of Watanabe does not inherently teach the viscosity of the present invention and to show that unexpected results are obtained when the oxetane compound of Watanabe is added to the ink of Roth. These tests were performed by myself or under my direct supervision and control.
4. Comparative Ink 1 was prepared in accordance with Example 4 in col. 16 of Watanabe. As shown in Table 1 in cols. 15-16 of Watanabe, Comparative Ink 1 was composed of a colorant (cyanine green), an oxetane compound (7,8-epoxy-2-oxa-5-methylspiro[3,5]-nonane), an initiator (UVI-6990), a polymerizable compound (ARONICS M-305) and an epoxy compound (Resin (A) obtained as described beginning at col. 13, line of 65 of Watanabe). Comparative Ink 1 did not contain an epoxidized fatty acid ester or an epoxidized

fatty acid glyceride as shown in the attached Table A. Comparative Ink 1 is therefore outside the scope of the present invention.

5. Comparative Ink 2 was prepared in accordance with Example 1 in col. 12 of Roth. As shown in the Table appearing in col. 13 of Roth, Comparative Ink 2 was composed of a colorant (bromocresol purple), an initiator (SarCat CD 1012), a polymerizable compound (triethylene glycol divinyl ether) and an epoxy compound (Cyracure UVR 6105). Comparative Ink 2 did not contain epoxidized fatty acid ester, an epoxidized fatty acid glyceride or an oxetane compound as shown in the attached Table A. Comparative Ink 2 is and is therefore outside the scope of the present invention.

6. Comparative Ink 3 was prepared in the same manner as Comparative Ink 2, except that the epoxy compound Cyracure UVR 6105 was replaced by the same amount of the oxetane compound 7,8-epoxy-2-oxa-5-methylspiro[3,5]-nonane employed in Comparative Ink 1. Comparative Ink 3 was composed of a colorant (bromocresol purple), an initiator (SarCat CD 1012), a polymerizable compound (triethylene glycol divinyl ether) and an oxetane compound 7,8-epoxy-2-oxa-5-

methylspiro[3,5]-nonane. Comparative Ink 3 did not contain an epoxidized fatty acid ester or an epoxidized fatty acid glyceride as shown in the attached Table A. Comparative Ink 3 is and is therefore outside the scope of the present invention.

7. Inventive Ink 4 was prepared in the same manner as Comparative Ink 3, except that the polymerizable compound triethylene glycol divinyl ether was replaced by the same amount of the epoxidized aliphatic acid ester E-4030 (Sanosizer E-4030, manufactured by Shin-Nippon Rika Co., Ltd., being an epoxidized fatty acid butyl disclosed at page 21, lines 7-8 of the above application). Inventive Ink 4 was composed of a colorant (bromocresol purple), an initiator (SarCat CD 1012), an oxetane compound 7,8-epoxy-2-oxa-5-methylspiro[3,5]-nonane and an epoxidized aliphatic acid ester (E-4030). Inventive Ink 4 is within the scope of the present invention as shown in the attached Table A.
8. The viscosity of Comparative Ink 1, Comparative Ink 2, Comparative Ink 3 and Inventive Ink 4 was measured. The measurements are shown in the attached Table B.

9. The storage stability and safety of Comparative Ink 1, Comparative Ink 2, Comparative Ink 3 and Inventive Ink 4 were measured in the manner described on page 23, line 8 to page 24, line 8 of this application. The evaluation results are shown in the attached Table B.
10. As shown in Table B, the viscosity of Comparative Ink 1 was 400 mPa·s at 23 °C. The viscosity was therefore too high for use in a conventional ink-jet apparatus.
11. As also shown in Table B, Inventive Ink 4 prepared in accordance with the present invention was superior in storage stability and safety compared to Comparative Ink 1, Comparative Ink 2 and Comparative Ink 3. Specifically, the viscosity of Inventive Ink 4 varied by less than 2.0 mPa·s after storage (A rating) and no skin change was observed when Inventive Ink 4 was adhered to the skin. In contrast, the viscosity of Comparative Ink 1, Comparative Ink 2 and Comparative Ink 3 varied by more than 5.0 mPa·s after storage (C rating) and skin either turned reddish brown or blistered when the inks were adhered.
12. It is my belief that the results shown in Table B are surprising because those skilled in the art would not

expect that a superior ink would be obtained when the ink has an epoxidized aliphatic ester and an oxetane compound.

It is declared by undersigned that all statements made herein of undersigned's own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the U.S. Code; and that such willful false statements may jeopardize the validity of this Application or any patent issuing thereon.

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Nobumasa Sasa

Dated:     This         day of                     , 2005.

Attached: Table A and Table B

Table A

Ink No.	Epoxidized aliphatic acid ester or glyceride	Oxetane compound	Epoxy compound	Polymerizable compound	Initiator	Colorant	Others
1		7,8-epoxy-2-oxa-5-methylspiro-[3.5]-nonane (8 parts by weight)	Resin (A) obtained in Productive Example of Watanabe et al (28 parts by weight)	ARONICS M-305 (3 parts by weight)	UVI-6990 (1.5 parts by weight) Irgacure 907 (3 parts by weight) DET-X-S (0.5 parts by weight)	Cyanine Green (0.5 parts by weight)	Talc (16 parts by weight) TSA-705S (0.5 parts by weight) butyl cellosolve acetate (39 parts by weight)
2			Cyracure UVR 6105 (40 parts by weight)	Triethylene Glycol Divinyl Ether (58 parts by weight)	SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)	
3		7,8-epoxy-2-oxa-5-methylspiro-[3.5]-nonane (40 parts by weight)		Triethylene Glycol Divinyl Ether (58 parts by weight)	SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)	
4	E-4030 (58 parts by weight)	7,8-epoxy-2-oxa-5-methylspiro-[3.5]-nonane (40 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)	

1: Watanabe et al Example 4

2: Roth Example 1

3: Modification of No. 2 employing the oxetane compound of No. 1 in place of epoxy compound (Cyrcure UVR 6105).

4: Modification of No. 3 employing the Epoxidized aliphatic acid ester E-4030 (Sansosizer E-4030, manufactured by Shin-Nippon Rika Co., Ltd., epoxidized fatty acid butyl) in place of Triethylene Glycol Divinyl Ether.

Table B

Ink No.	Viscosity mPa·s ( 23 °C )	Ink Storage Stability	Safety	Remarks
1	400	C	C	Prior art
2	35	C	C	Prior art
3	45	C	B	Prior art
4	43	A	A	Invention